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<120> Process for typing of HCV isolates

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<140> 09/899,082

<141> 2001-07-06

<150> 09/378,900

<151> 1999-08-23

<150> 09/044,665

<151> 1998-03-19

<150> 08/256,568

<151> 1994-07-18

<150> PCT/EP93/03325

<151> 1993-11-26

<150> EP92403222

<151> 1992-11-27

<150> EP93402129

<151> 1993-08-31

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<170> PatentIn version 3.1

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ggtagagttca ccggaatcgc cgggatgacc gggtcctttc ttggaatcaa cccgctcaat 120

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Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

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25

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 35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Phe Thr Thr Ser Met  
 50 55 60

Gly Asn Thr Met Thr Cys Tyr Ile Lys Ala Leu Ala Ala Cys Lys Ala  
 65 70 75 80

Ala Gly Ile Val Asp Pro Val Met Leu Val Cys Gly Asp Asp Leu Val  
 85 90 95

Val Ile Ser Glu Ser Gln Gly Asn Glu Glu Asp Glu Arg Asn Leu Arg  
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Ala

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Glu Arg Leu Tyr Val Gly Gly Pro Met Leu Asn Ser Lys Gly Gln Thr  
 35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Phe Thr Thr Ser Met  
 50 55 60

Gly Asn Thr Ile Thr Cys Tyr Val Lys Ala Gln Ala Ala Cys Lys Ala  
 65 70 75 80

Ala Gly Ile Ile Ala Pro Thr Met Leu Val Cys Gly Asp Asp Leu Val  
 85 90 95

Val Ile Ser Glu Ser Gln Gly Thr Glu Glu Asp Glu Arg Asn Leu Arg  
100 105 110

Ala

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Glu Arg Leu Tyr Cys Gly Gly Pro Met Phe Asn Ser Lys Gly Ala Gln  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Pro Thr Ser Phe  
50 55 60

Gly Asn Thr Ile Thr Cys Tyr Ile Lys Ala Thr Thr Ala Ala Lys Ala  
65 70 75 80

Ala Gly Leu Arg Asn Pro Asp Phe Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Val Ala Glu Ser Asp Gly Val Asp Glu Asp Arg Ala Ala Leu Arg  
100 105 110

Ala

<210> 86  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 86

Ser Thr Val Thr Glu Lys Asp Ile Arg Val Glu Glu Glu Val Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Ala Ile Thr Ala Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met His Asn Ser Lys Gly Asp Leu  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Tyr Thr Thr Ser Phe  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Ile Lys Ala  
65 70 75 80

Ala Gly Leu Arg Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Ala Glu Ser Asp Gly Val Glu Glu Asp Lys Arg Pro Leu Gly  
100 105 110

Ala

<210> 87  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 87

Ser Thr Val Thr Glu Lys Asp Ile Arg Val Glu Glu Glu Val Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Arg Ala Ile Thr Ala Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met His Asn Ser Arg Gly Asp Leu  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Tyr Thr Thr Ser Phe  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Ile Arg Ala  
65 70 75 80

Ala Gly Leu Arg Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Ala Glu Ser Asp Gly Val Glu Glu Asp Lys Arg Ala Leu Gly  
100 105 110

Ala

<210> 88  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 88

Ser Thr Val Thr Glu Lys Asp Ile Arg Val Glu Glu Glu Val Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Val Ile Thr Ala Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met His Asn Ser Lys Gly Asp Leu  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Tyr Thr Thr Ser Phe  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Ile Arg Ala  
65 70 75 80

Ser Gly Leu Arg Asp Cys Thr Met Leu Val Tyr Gly Asp Asp Leu Val  
85 90 95

Val Ile Ala Glu Ser Asp Gly Val Glu Glu Asp Lys Arg Ala Leu Gly  
100 105 110

Val

<210> 89  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 89

Ser Thr Val Thr Glu Lys Asp Ile Arg Val Glu Glu Glu Val Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Ala Ile Thr Ala Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met His Asn Ser Lys Gly Asp Leu  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Tyr Thr Thr Ser Phe  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Ile Arg Ala  
65 70 75 80

Ala Gly Leu Arg Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Ala Glu Ser Asp Gly Val Glu Glu Asp Lys Arg Ala Leu Gly  
100 105 110

Ala

<210> 90  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 90

Ser Thr Val Thr Glu Arg Asp Ile Arg Thr Glu Glu Glu Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Val Ile Ser Ala Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met Tyr Asn Ser Lys Gly Asp Leu  
35 40 45

Cys Gly Gln Arg Arg Cys Arg Ala Ser Gly Val Tyr Thr Thr Ser Phe  
50 55 60

Gly Asn Thr Val Thr Cys Tyr Leu Lys Ala Val Ala Ala Thr Arg Ala



65

70

75

80

Ala Gly Leu Lys Gly Cys Ser Met Leu Val Cys Gly Asp Asp Leu Val  
                     85                    90                    95

Val Ile Cys Glu Ser Gly Gly Val Glu Glu Asp Ala Arg Ala Leu Arg  
                     100                    105                    110

Ala

&lt;210&gt; 91

&lt;211&gt; 113

&lt;212&gt; PRT

&lt;213&gt; hepatitis C virus

&lt;400&gt; 91

Ser Thr Val Thr Glu Arg Asp Ile Lys Val Glu Glu Glu Val Tyr Gln  
   1                    5                    10                    15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Val Ile Ala Ala Leu Thr  
                     20                    25                    30

Glu Arg Leu Tyr Val Gly Gly Pro Met His Asn Ser Lys Gly Asp Leu  
                     35                    40                    45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Tyr Thr Thr Ser Phe  
                     50                    55                    60

Gly Asn Thr Met Thr Cys Tyr Leu Lys Ala Ser Ala Ala Ile Arg Ala  
   65                    70                    75                    80

Ala Gly Leu Lys Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
                     85                    90                    95

Val Ile Ala Glu Ser Gly Gly Val Glu Glu Asp Lys Arg Ala Leu Gly  
                     100                    105                    110

Ala

&lt;210&gt; 92

&lt;211&gt; 113

&lt;212&gt; PRT

<213> hepatitis C virus

<400> 92

Ser Thr Val Thr Glu His Asp Ile Met Thr Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Ser Cys Asp Leu Gln Pro Glu Ala Arg Ala Ala Ile Arg Ser Leu Thr  
20 25 30

Gln Arg Leu Tyr Cys Gly Gly Pro Met Tyr Asn Ser Lys Gly Gln Gln  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Phe Thr Thr Ser Met  
50 55 60

Gly Asn Thr Met Thr Cys Tyr Ile Lys Ala Leu Ala Ser Cys Arg Ala  
65 70 75 80

Ala Arg Leu Arg Asp Cys Thr Leu Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Ala Ile Cys Glu Ser Gln Gly Thr His Glu Asp Glu Ala Ser Leu Arg  
100 105 110

Ala

<210> 93

<211> 18

<212> DNA

<213> artificial

<220>

<223> artificial

<400> 93

gagtgttgta cagcctcc

18

<210> 94

<211> 17

<212> DNA

<213> artificial

<220>

<223> artificial

<400> 94	
tgcccggaaa tttgggc	17
<210> 95	
<211> 16	
<212> DNA	
<213> artificial	
<220>	
<223> artificial	
<400> 95	
tgcccggaga tttggg	16
<210> 96	
<211> 17	
<212> DNA	
<213> artificial	
<220>	
<223> artificial	
<400> 96	
gagtgtcgaa cagcctc	17
<210> 97	
<211> 16	
<212> DNA	
<213> artificial	
<220>	
<223> artificial	
<400> 97	
gggggcctgg aggctg	16
<210> 98	
<211> 260	
<212> DNA	
<213> hepatitis C virus	
<400> 98	
ccaccatgaa tcactcccct gtgaggaact actgtcttca cgcagaaagc gtctagccat	60
ggcgttagta tgagtgtcgt gcagcctcca ggaccccccc tcccgggaga gccatagtgg	120
tctgcggaac cggtgagtac accggaattg ccaggacgac cgggtccttt cttggatcaa	180
cccgtcaat gcctggagat ttgggcgtgc ccccgcaaga ctgctagccg agtagtgttg	240
ggtcgcgaaa ggccttgggt	260

<210> 99  
<211> 260  
<212> DNA  
<213> hepatitis C virus

<400> 99  
ccaccataga tcactcccct gtgaggaact actgtcttca cgcagaaagc gtctagccat 60  
ggcgtagta tgagtgttgt gcagcctcca ggaccccccc tcccgggaga gccatagtgg 120  
tctgcggaac cggtgagtac accggaattg ccaggacgac cgggtccttt cttggatcaa 180  
cccgtcaat gcctggagat ttgggcgtgc ccccgcgaga ctgctagccg agtagtggtg 240  
ggtcgcgaaa ggccttgggt 260

<210> 100  
<211> 260  
<212> DNA  
<213> hepatitis C virus

<400> 100  
ccgccatgaa ccactcccct gtgaggaact actgtcttca cgcagaaagc gtctagccat 60  
ggcgtagta tgagtgtcgt acagcctcca ggcccccccc tcccgggaga gccatagtgg 120  
tctgcggaac cggtgagtac accggaattg ccgggaagac tgggtccttt cttggataaa 180  
cccactctat gcccggtcat ttgggcgtgc ccccgcaaga ctgctagccg agtagcggtg 240  
ggttgcgaaa ggccttgggt 260

<210> 101  
<211> 260  
<212> DNA  
<213> hepatitis C virus

<400> 101  
ccgccatgaa tcactcccct gtgaggaact actgtcttca cgcagaaagc gtctagccat 60  
ggcgtagta tgagtgtcgt acagcctcca ggcccccccc tcccgggaga gccatagtgg 120  
tctgcggaac cggtgagtac accggaatta ccggaaagac tgggtccttt cttggataaa 180  
cccactctat gtccggtcat ttgggcacgc ccccgcaaga ctgctagccg agtagcggtg 240  
ggttgcgaaa ggccttgggt 260

<210> 102  
<211> 190  
<212> DNA  
<213> hepatitis C virus

<400> 102

cgagtgtcgt gcagcctcca ggaccccccc tcccgggaga gccatagtgg tctgcggaac 60  
 cggtgagtac accggaatcg ctgggggtgac cgggtccttt cttggaacaa cccgctcaat 120  
 acccagaaat ttgggcgtgc cccgcgaga tcactagccg agtagtggtg ggtcgcgaaa 180  
 ggccttgggt 190

<210> 103  
 <211> 227  
 <212> DNA  
 <213> hepatitis C virus

<400> 103  
 gtcttcacgc agaaagcgtc tagccatggc gttagtatga gtgttgtaca gcctccagga 60  
 cccccctcc cgggagagcc atagtggctc gcggaaccgg tgagtacacc ggaatcgctg 120  
 gggtgaccgg gtcctttctt ggataaaccc gctcaatgcc cggaaatttg ggcgtgcccc 180  
 cgcaagactg ctagccgagt agtggtgggt cgcgaaaggc cttgggt 227

<210> 104  
 <211> 177  
 <212> DNA  
 <213> hepatitis C virus

<400> 104  
 gagtgtcgtg cagcctccag gccccccct cccgggagag ccatagtggc ctgcggaacc 60  
 ggtgagtaca ccggaatcgc cgggatgacc gggtcctttc ttggaacaac ccgctcaatg 120  
 cccggaatt ttggcgtgcc cccgcgagat cactagccga gtagtggttg gtcgcga 177

<210> 105  
 <211> 109  
 <212> DNA  
 <213> hepatitis C virus

<400> 105  
 gagtgttgta cagcctccag gccccccct cccgggagag ccatagtggc ctgcggaacc 60  
 ggtgagtaca ccggaatcgc cgggatgacc gggtcctttc ttggatcaa 109

<210> 106  
 <211> 109  
 <212> DNA  
 <213> hepatitis C virus

<400> 106  
 gagtgttgta cagcctccag gccccccct cccgggagag ccatagtggc ctgcggaacc 60  
 ggtgagtaca ccggaatcgc caggacgacc gggtcctttc ttggatcaa 109

<210> 107  
<211> 109  
<212> DNA  
<213> hepatitis C virus

<400> 107  
gagtgttgta cagcctccag gacccccct cccgggagag ccatagtggc ctgcggaacc 60  
ggtgagtaca ccggaatcgc cgggatgacc gggtcctttc ttggataaa 109

<210> 108  
<211> 177  
<212> DNA  
<213> hepatitis C virus

<400> 108  
gagtgtcgaa cagcctccag gacccccct cccgggagag ccatagtggc ctgcggaacc 60  
ggtgagtaca ccggaattgc cgggatgacc gggtcctttc ttggataaac ccgctcaatg 120  
cccggagatt tgggcgtgcc cccgcgagac tgctagccga gtagtggtg gtcgcga 177

<210> 109  
<211> 180  
<212> DNA  
<213> hepatitis C virus

<400> 109  
gagtgtcgta cagcctccag gccccccct cccgggagag ccatagtggc ctgcggaacc 60  
ggtgagtaca ccggaattgc caggatgacc gggtcctttc cattggatca aaccgctca 120  
atgcctggag atttggcgt gccccgcaa gactgctagc cgagtagtgt tgggtcgcga 180

<210> 110  
<211> 112  
<212> DNA  
<213> hepatitis C virus

<400> 110  
gagtgtcgta cagcctccag gccccccct cccgggagag ccatagtggc ctgcggaacc 60  
ggtgagtaca ccggaattgc caggatgacc gggtcctttc cattggatca aa 112

<210> 111  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 111

Ser Thr Val Thr Glu Ser Asp Ile Arg Thr Glu Glu Ala Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Asp Pro Gln Ala Arg Val Ala Ile Lys Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Leu Thr Asn Ser Arg Gly Glu Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Ile Lys Ala Arg Ala Ala Cys Arg Ala  
65 70 75 80

Ala Gly Leu Gln Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Val Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Ala

<210> 112  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 112

Ser Thr Val Thr Glu Ser Asp Ile Arg Thr Glu Glu Ala Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Asp Pro Gln Ala Arg Val Ala Ile Arg Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Leu Thr Asn Ser Arg Gly Glu Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Ile Lys Ala Arg Ala Ala Cys Arg Ala  
65 70 75 80

Ala Gly Leu Gln Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Val Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Ala

<210> 113  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 113

Ser Thr Val Thr Glu Ser Asp Ile Arg Thr Glu Glu Ala Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Asp Pro Gln Ala Arg Val Ala Ile Lys Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Leu Thr Asn Ser Arg Gly Glu Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Arg Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Arg Tyr Ile Lys Ala Arg Ala Ala Cys Arg Ala  
65 70 75 80

Ala Gly Leu Gln Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Val Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Ala

<210> 114  
<211> 113  
<212> PRT  
<213> hepatitis C virus



<400> 114.

Ser Thr Val Thr Glu Asn Asp Ile Arg Thr Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Thr Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ala Leu Arg  
100 105 110

Ala

<210> 115

<211> 113

<212> PRT

<213> hepatitis C virus

<400> 115

Ser Thr Val Thr Glu Ser Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Val Ile Arg Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Asn Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

<210> 116  
<211> 113  
<212> PRT  
<213> hepatitis C virus  
  
<400> 116

Ser Thr Val Thr Gln Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Arg Ala Ile Lys Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

<210> 117

<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 117

Ser Thr Val Thr Glu Ser Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

<210> 118  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 118

Ser Thr Val Thr Glu Ser Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Thr Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ala Leu Arg  
100 105 110

Ala

<210> 119  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 119

Ser Thr Val Thr Glu Ser Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile Lys Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Thr Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

<210> 120  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 120

Ser Thr Val Thr Glu Ser Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile Lys Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Thr Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

<210> 121  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 121

Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile Lys Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn

35

40

45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys  
50 55 60

Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ser Ala Ala Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly Asp Asp Leu Val  
85 90 95

Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala Ala Ser Leu Arg  
100 105 110

Val

<210> 122

<211> 113

<212> PRT

<213> hepatitis C virus

<400> 122

Ser Thr Val Thr Glu Arg Asp Ile Arg Thr Glu Glu Ser Ile Tyr Arg  
1 5 10 15

Ala Cys Ser Leu Pro Glu Glu Ala His Thr Ala Ile His Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met Phe Asn Ser Lys Gly Gln Thr  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Met  
50 55 60

Gly Asn Thr Ile Thr Cys Tyr Val Lys Ala Leu Ala Ala Cys Lys Ala  
65 70 75 80

Ala Gly Ile Ile Ala Pro Thr Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Ser Glu Ser Gln Gly Thr Glu Glu Asp Glu Arg Asn Leu Arg  
100 105 110

Ala

<210> 123  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 123

Ser Thr Val Thr Glu Arg Asp Ile Arg Thr Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Ala Cys Ser Leu Pro Gln Glu Ala Arg Thr Val Ile His Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Val Gly Gly Pro Met Thr Asn Ser Lys Gly Gln Ser  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Phe Thr Thr Ser Met  
50 55 60

Gly Asn Thr Met Thr Cys Tyr Ile Lys Ala Leu Ala Ala Cys Lys Ala  
65 70 75 80

Ala Gly Ile Val Asp Pro Val Met Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Ile Ser Glu Ser Gln Gly Asn Glu Glu Asp Glu Arg Asn Leu Arg  
100 105 110

Ala

<210> 124  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 124

Ser Thr Val Thr Glu Gln Asp Ile Arg Val Glu Glu Glu Ile Tyr Gln  
1 5 10 15

Cys Cys Asn Leu Glu Pro Glu Ala Arg Arg Val Ile Ser Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Cys Gly Gly Pro Met Phe Asn Ser Lys Gly Ala Gln  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Pro Thr Ser Phe  
50 55 60

Gly Asn Thr Ile Thr Cys Tyr Ile Lys Ala Thr Ala Ala Ala Lys Ala  
65 70 75 80

Ala Gly Leu Arg Asn Pro Asp Phe Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Val Ala Glu Ser Asp Gly Val Asp Glu Asp Arg Ala Ala Leu Arg  
100 105 110

Ala

<210> 125  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 125

Ser Thr Val Thr Glu Gln Asp Ile Arg Val Glu Glu Glu Ile Tyr Gln  
1 5 10 15

Cys Cys Asn Leu Glu Pro Glu Ala Arg Lys Val Ile Ser Ser Leu Thr  
20 25 30

Glu Arg Leu Tyr Cys Gly Gly Pro Met Tyr Asn Ser Lys Gly Val Gln  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Pro Thr Ser Phe  
50 55 60

Gly Asn Thr Ile Thr Cys Tyr Ile Lys Ala Thr Ala Ala Ala Arg Ala  
65 70 75 80

Ala Gly Leu Arg Asn Pro Asp Phe Leu Val Cys Gly Asp Asp Leu Val  
85 90 95



Val Val Ala Glu Ser Asp Gly Val Asp Glu Asp Arg Thr Ala Leu Arg  
 100 105 110

Ala

<210> 126  
 <211> 113  
 <212> PRT  
 <213> hepatitis C virus

<400> 126

Ser Thr Val Thr Glu His Asp Ile Arg Thr Glu Glu Glu Ile Tyr Gln  
 1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Ala Ile Ser Ala Leu Thr  
 20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Met Tyr Asn Ser Lys Gly Leu Gln  
 35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Pro Thr Ser Phe  
 50 55 60

Gly Asn Thr Ile Thr Cys Tyr Ile Lys Ala Thr Ala Ala Ser Arg Ala  
 65 70 75 80

Ala Gly Leu Lys Asp Pro Ser Phe Leu Val Cys Gly Asp Asp Leu Val  
 85 90 95

Val Val Ser Glu Ser Cys Gly Val Glu Glu Asp Arg Ala Ala Leu Arg  
 100 105 110

Ala

<210> 127  
 <211> 113  
 <212> PRT  
 <213> hepatitis C virus

<400> 127

Ser Thr Val Thr Glu Gln Asp Ile Arg Thr Glu Glu Glu Ile Tyr Gln  
 1 5 10 15

Cys Cys Asp Leu Glu Pro Glu Ala Arg Lys Ala Ile Ser Ala Leu Thr  
20 25 30

Glu Arg Leu Tyr Ile Gly Gly Pro Met Tyr Asn Ser Lys Gly Leu Gln  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu Pro Thr Ser Phe  
50 55 60

Gly Asn Thr Ile Thr Cys Tyr Ile Lys Ala Thr Ala Ala Ser Arg Ala  
65 70 75 80

Ala Gly Leu Lys Asp Pro Ser Phe Leu Val Cys Gly Asp Asp Leu Val  
85 90 95

Val Val Ser Glu Ser Cys Gly Val Glu Glu Asp Arg Ala Ala Leu Arg  
100 105 110

Ala

<210> 128  
<211> 113  
<212> PRT  
<213> hepatitis C virus

<400> 128

Ser Thr Val Thr Glu His Asp Ile Met Thr Glu Glu Ser Ile Tyr Gln  
1 5 10 15

Ser Leu Tyr Leu Gln Pro Glu Ala Arg Val Ala Ile Arg Ser Leu Thr  
20 25 30

Gln Arg Leu Tyr Cys Gly Gly Pro Met Tyr Asn Ser Lys Gly Gln Gln  
35 40 45

Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Phe Thr Thr Ser Met  
50 55 60

Gly Asn Thr Met Thr Cys Tyr Ile Lys Ala Leu Ala Ser Cys Arg Ala  
65 70 75 80

Ala Lys Leu Gln Asp Cys Thr Leu Leu Val Cys Gly Asp Asp Leu Val

85

90

95

Ala Ile Cys Glu Ser Gln Gly Thr His Glu Asp Lys Ala Ser Leu Arg  
100 105 110

Ala